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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/630,934 | 07/31/2003 | So Suzuki | KAN 154 | 1233 |

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1101 14TH STREET, NW
SUITE 500
WASHINGTON, DC 20005

EXAMINER

TOLEDO, FERNANDO L

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2823

DATE MAILED: 03/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/630,934

Applicant(s)

SUZUKI, SO

Examiner

Fernando L. Toledo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 07/31/2003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 – 3 and 5 – 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Wu, Chi-Hsi (U. S. patent 6,239,007 B1).

In re claim 1, Wu, in the U. S. patent 6,239,007 B1; figures 1A – 1F and related text, discloses forming first polysilicon 102 serving as a gate on a semiconductor substrate 100; forming a first insulating film 104 on the semiconductor substrate to cover the first polysilicon; forming a second insulating film 106 on the first insulating film; selectively etching the second insulating film until the first insulating film located on an upper surface of the gate is exposed (Figure 1B); selectively etching the first insulating film located on the upper surface of the gate until the upper surface of the gate is exposed (Figure 1C); burying a space in which the first insulating film is etched, and forming a second polysilicon 108 on the second insulating film (Figure 1D); etching the second polysilicon, exposing the second insulating film, and leaving the

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second polysilicon in the space (Figure 1E); etching the second insulating film (Figure 1F); etching the first insulating film (Figure 1F); forming high melting point metal 110 covering the second polysilicon; siliciding the second polysilicon by a heat treatment (Column 3, Lines 35 – 50); and removing unreacted high melting point metal (Figure 1F).

4. In re claim 2, Wu discloses wherein the first insulating film is formed to have such a thickness to leave a difference in height around the first polysilicon (Figure 1A);

5. In re claim 3, Wu discloses wherein the first insulating film is formed to be thinner than the first polysilicon (Figure 1A).

6. In re claim 5, Wu discloses wherein the second insulating film is formed to have such a thickness as to flatten a difference in height near the first polysilicon (Figure 1B).

7. In re claim 6, Wu discloses wherein in the step of selectively etching the second insulating film, an etch-back method is used (Column 3, Lines 5 – 10).

8. In re claim 7, Wu discloses wherein a condition for etching the first insulating film is that the second insulating film is hardly etched (Column 3, Lines 5 – 10).

9. In re claim 8, Wu discloses wherein the second polysilicon is formed to have such a thickness as to flatten a difference in height near the space (Figure 1E).

10. In re claim 9, Wu discloses wherein the second polysilicon is undoped polysilicon (Column 3, Lines 20 – 25).

11. In re claim 10, Wu discloses wherein a dry etching method is used for etching (Column 3, Lines 15 – 20).

12. In re claim 11, Wu discloses wherein the high melting point metal is one of titanium and cobalt (Column 3, Lines 45 – 50).

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13. In re claim 12, Wu discloses forming a lower gate electrode 102 of the T-type gate electrode on a semiconductor substrate; sequentially forming a first insulating film 104 and a second insulating film 106 on the lower gate electrode; selectively removing the second insulating film until the first insulating film located on the upper surface of the lower gate electrode is exposed (Figure 1B); selectively removing the second insulating film until the first insulating film located on the upper surface of the lower gate electrode until the upper surface of the lower electrode is exposed (Figure 1C); forming an upper gate electrode 108 of the T-type gate electrode in a space from which the first insulating film is removed (Figure 1D).

14. In re claim 13, Wu discloses wherein the first insulating film is formed to have such a thickness as to leave a difference in height around the lower gate electrode (Figure 1B).

15. In re claim 14, Wu discloses wherein the second insulating film is formed to have such thickness as to flatten a difference in height around the lower gate electrode (Figure 1C).

16. In re claim 15, Wu discloses wherein in the step of selectively removing the second insulating film, and etch-back method is used (Column 3, Lines 5 – 10).

17. In re claim 16, Wu discloses wherein a condition for removing the first insulating film is that the second insulating film is hardly removed (Column 3, Lines 5 – 10).

18. In re claim 17, Wu discloses wherein the space is formed to be wider than the lower gate electrode (Figure 1C).

19. In re claim 18, Wu discloses wherein the upper gate electrode is formed to have such a thickness as to flatten a difference in height around the space (Figure 1E).

20. In re claim 19, Wu discloses wherein a dry etching method is used for removing the first insulating film (Column 3, Lines 15 – 20).

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21. In re claim 20, Wu discloses wherein the upper gate electrode is formed by etching back metal of the upper gate electrode formed on an entire surface of the semiconductor substrate to bury the space (Figure 1F).

Claim Rejections - 35 USC § 103

22. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

23. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu.

In re claim 4, Wu does not disclose wherein the first insulating film is formed to be thicker than the first polysilicon.

It would have been obvious to one having ordinary skill in the art at the time the invention was made wherein the first insulating film is formed to be thicker than the first polysilicon, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Note that the specification contains no disclosure of either the critical nature of the claimed thickness or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen thickness or upon another variable recited in a claim, the Applicant must show that the chosen thickness is critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990). In addition, the selection of insulating layer thickness, is obvious because it is a matter of determining optimum process

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conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996)(claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill or art) and In re Aller, 105 USPQ 233 (CCPA 1995) (selection of optimum ranges within prior art general conditions is obvious).

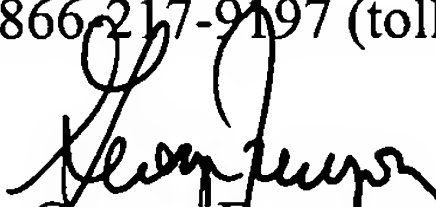
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando L. Toledo whose telephone number is 571-272-2187. The examiner can normally be reached on Mon-Fri 8am to 4pm.

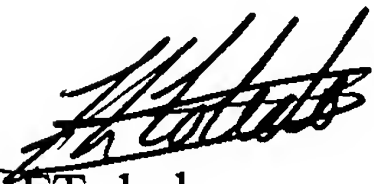
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Updated contact information can be found at <http://www.uspto.gov/web/info/2800.htm>.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



George Fourson
Primary Examiner
Art Unit 2823



FToledo

February 6, 2004